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NEWSLETTER

of the

Hawaiian Botanical Society

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NOTICE

Dues are due

Our society's membership year begins December 1 and expires November 30. Make payment to our Treasurer, Ercell Woolford at the next meeting or send a check to her at 3797A Sierra Drive, Honolulu, Hawaii 96816. See outside back page this issue for rates.

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PRINCIPAL PAPERS

NEW CROPS FOR HAWAII AND THE TROPICS[1/]

By H. Ronald Hurov

Marco Polo returned from China and the Far East in the late 13th Century with marvelous tales and samples of exotic spices. His wondrous adventures spurred merchants, kings, explorers, and others to find a sea route to China and the Spice Islands of the Indies. Columbus sought the spice islands but found America instead! Six years later Vasco da Gama sailed the Indian Ocean and reached the coast of Malabar. And finally in 1521 Magellan and his crew reached the Spice Islands, while circumnavigating the globe. These explorations led to the finding and development of many new crops. The western hemisphere donated tobacco, rubber, maize, cacao, kapok, tapioca, vanilla, allspice, pineapple, potatoes, and tomatoes. S. E. Asia presented sugar cane, tea, bananas, cinnamon, pepper, cloves, nutmegs, mango, litchi, rice, and others. Africa gave oil palm, coffee, sorghum, castor oil, and others. Botanical gardens were established to preserve germ plasm for the new crops. Some of these plants gave birth to plantation agriculture, and the concomitant development of European colonies throughout the tropical world.

1/ Address of retiring President of Hawaiian Botanical Society, December 1971. The author is a staff member of the Pacific Biomedical Research Center, University of Hawaii.

SHOUT
SHARE
IT

Plantation agriculture has been the bulwark of tropical agriculture since the discoveries; but today this system is facing a crisis of survival. Tropical monoculture can no longer rely on abundant cheap labor, secure markets, outside investors, trained researchers, and skilled administrators. In Hawaii this survival crisis has resulted reductions in area farmed, in workers being laid off, and research cutbacks. Honolulu Star Bulletin and Advertiser news items of November and December 1971 emphasize the local problems: "Gloomy predications for Isle Pine"; "Kilauea land placed on open market"; "Kahuku mill closes"; "Passing Plantations"; The last pauhana - scores jobless"; "125 face end of era as plantation closes"; "Kilauea Sugar Co. shuts down"; "Shutdown makes Kahuku a mill town without a mill"; and "State wants Agric. Preserved - Save the land laws eyed".

Today, we need crops which can be used in alternate systems of agriculture such as coops, joint ventures, part-time farming etc., and which can supply jobs and occupy vacated lands. There are tremendous potentials for finding new crops - particularly in the tropics. Of some 250,000 species of plants which have been identified, only about 150 account for most of the world's cultivated crops.

Following is a list I have compiled of crops that might replace and supplement sugar cane and pineapple in Hawaii, and other threatened crops in the tropics:

BEVERAGES

Ilex paraguariensis - Mate - The leaves from this small South American tree are used in a tea-like beverage. Mechanization is possible. The tree grows very well at the Wahiawa Botanical Gardens.

Paullinia yoco - Yoco - A tree from the Amazon. A tea-like beverage, made from the bark, acts as a hunger depressant. Yoco contains 3 to 6% caffeine.

Catha edulis - Khat - A beverage, obtained from the leaves and young twigs of this Arabian tree produces a stimulating and hypnotic effect on the drinker. The tree grows well in Wahiawa and is worthy of further investigation.

Brosimum utile - Cow Tree - This Central American tree produces an edible latex which reportedly has all the properties of the finest cows milk. The latex never curdles in coffee, cocoa or tea and keeps well for one week, unrefrigerated. Brosimum latex is thicker than ordinary milk, and a cream like substance rises on standing. A young specimen is growing at the Foster Botanical Gardens.

TASTE MODIFIERS

Synsepalum dulcificum - Miracle Fruit - A substance in the flesh of this coffee sized fruit paralyzes the sour taste buds for up to 1½ hours. There is renewed interest in this tropical African shrub because of the recent clampdown by FDA on synthetic sweeteners. An Eastern U. S. firm recently announced plans to make a dietary pill from it.

Dioscoreophyllum cuminse - Serindipity Berry - The fruit of this African Vine contains a substance which is 1500 x sweeter than sugar. The author obtained a specimen of Dioscoreophyllum from Florida - and it has successfully flowered in Hawaii.

GUMS

Ceratonia siliqua - Carob or Locust Bean - Carob seed gum is used as a moisture retaining agent in cheeses, as a stabilizer in ice creams and in the paper industry to impart wet strength, increase machine speed, and as a beater additive. Carob is also a popular substitute for chocolate in the organic food trade. A tree in the Waimanalo Arboretum produces a prolific crop of pods.

Cyamopsis tetragonoloba - Guar - The seed gum is used for coating and improving the strength of certain grades of paper; for backing postage stamps; for sizing textiles; and as a stabilizer and thickener in food products, such as ice cream, bakery mixes and salad dressings. The bushy 3 to 9 foot plant is hard and very drought resistant. It should grow well in arid areas like west Molokai. Guar yields up to 1,000 pounds of seed and 10,000 pounds of fodder/acre.

Leucaena leucacephella - Koa Haole - The composition of the seed gum is very similar to guar gum, and its viscosity is 1½ to 2 times as high as Gum Arabic. (Hawaii Farm Science Jan. 1962). The leaf contains a muculage which is similar to Gum Arabic and Gum Tragacanth. The tree grows wild in semi-arid areas throughout Hawaii.

Prosopis juliflora - Kiawe - The bark produces gum which can be used in varnishes and glue.

INDUSTRIAL OILS

Aleurites moluccana - Kukui Nut - Lumbang oil of commerce, which is obtained from the nuts, is similar to linseed and can be used in manufacturing paints, varnishes, linoleum, soaps, and wood preservatives. Kukui nuts are readily available in Hawaii, and they could be gathered mechanically.

Momordica balsamina - Bittermelon - According to recent USDA findings the seeds contain 26% of an oil which is very similar to Tung Oil and the seed residue is very high in protein. It is a common weed in pineapple fields and is grown as a vegetable by Filipinos and Chinese.

Moringa oleifera - Marungai - Ben oil, obtained from the seed, is used in perfumery and ointments because it has no color, taste or smell. Marungai is grown as an ethnic food by Filipinos, and specimens can be found in most plantation villages in Hawaii.

Orbignea cohune - Cohune Nut - The seed oil is superior to coconuts and is used in the manufacture of candles, soaps, and machine oil. Cohune Nut grows very well on Oahu.

Pongamia pinnata - Pongam Oil - The seed oil is used in the manufacture of soap and candles, and for the treatment of rheumatism. There is a flourishing Pongam tree on the UH campus.

Sapium sebiferum - Chinese Tallow - This tree grows well at the Foster Botanical Gardens. Oil from the seeds is used in the manufacture of soaps, candles, and varnishes, and is a good substitute for lard.

Terminalia catappa - False Kamani - Indian Almond oil is obtained from the seed kernel. The oil does not become rancid as fast as Almond oil.

DYES

Bixa orellana - Annatto - A dye obtained from the seed pulp is used for coloring butter, margarine, cheeses, and chocolate. The trees grow well in Hawaii.

ESSENTIAL OILS, MEDICINALS, FLAVORINGS, AND SPICES

Cinnamomum camphora - Natural Camphor - Camphor oil, in short supply is obtained from the wood distillate. The wood can be harvested mechanically by pruning. Camphor grows well in Hawaii.

Cinnamomum cassia - Chinese Cassia - Cassia oil is extracted from the leaves, and can be harvested mechanically.

Dipteryx odorata - Tonka Bean - The fragrant seeds produce an oil which is used to flavor tobacco.

Pimenta officinalis - Allspice - This tree grows very well and produces abundant berries on Oahu. Excellent specimens are found in Wahiawa and at the Governor's residence, Washington Place, in downtown Honolulu. Allspice is the dried green berries.

Eugenia caryophyllata - Cloves - The unopened flower buds produce the clove spice of commerce.

Piper Nigrum - Pepper - The spice is obtained from small berries which hang in clusters from a sprawling vine. A fruiting specimen is growing at Foster Botanical Gardens.

Vanilla fragrans - Vanilla - A large grove of vanilla is growing wild in upper Manoa Valley. Hand pollination is necessary to produce a good crop of pods. The possibility of growing vanilla in Hawaii attracted a great deal of attention in the late 1800's.

ESSENTIAL OILS-PERFUME

Pelea anisata - Mokihana - A perfume oil is obtained from the leaves and fruits of this small tree. It is a native of Kauai. One local perfume firm already uses Mokihana for preparing a men's cologne.

Illicium vera - Star Anise - This essential oil is produced in mainland China from the leaves of a small evergreen tree. It is a large volume item, and is presently scarce.

Canangium odoratum - Ylang Ylang - Canangium trees grow very well at the Waimanalo Experimental Station. A perfume is obtained from the green flowers.

Cimbapogon nardus - Citronella Grass - Over $2.3 million worth of citronella was imported into the U. S. from Ceylon and Java in 1971. Leaves can be harvested 8 months after planting and then every 4 months. About 40-50 pounds of oil can be obtained per acre.

Pelargonium graviolens - Geranium oil - According to Dr. Baumgartner of Liana Perfumes Honolulu, there is great potential for growing this crop in Hawaii. Pelargonium is a shrubby fragrant plant suited to a rather dry warm climate like Molokai. Oil is obtained from the leaves.

Mimusops elengi - Surinam Medlar - Several specimens are growing in Ala Moana Park. A perfume is obtained from the flowers.

PAPER

Hibiscus cannabinus - Kenaf - Certain varieties of this 10 to 16 foot annual shrub produce excellent paper pulp. Experimental yields have run as high as 20 tons / acre in Florida. In India, 850,000 acres of Kenaf are grown for textile and cordage fiber.

SUGAR

Arenga saccharifera - Sugar Palm - Sugar is obtained by tapping the male flowers. One tree can produce up to 25 pounds sugar / year.

STARCH

Marantha arundinacea - Arrowroot - The root starch is used in baby foods.

WAX

Copernicia cerifera - Carnauba wax - This palm grows quite well at the Foster Botanical Gardens. A commercial wax for polished and candles is obtained by boiling the withered leaves.

MEDICINALS

Aloe vera and barbadensis - Aloe is used in cosmetics, laxatives and burn remedies. The plant grows very well in dry areas.

Dioscorea species - Barbasco - Steroids from this genus are used for manufacturing birth control pills. The present supply comes from wild stands in Mexico. A commercial planting is now being tried in Puerto Rico. This crop has a tremendous market potential.

Centella asiatica - Asiatic Pennywort - This creeping vine grows wild in Hawaii. In India and Ceylon the leaves are used in salads, teas and in curing insanity, improving memory and mental weakness, and counteracting certain chronic nervous diseases.

Piper methysticum - Awa - The root contains a soporific drug which the ancient Hawaiians and Polynesians used as a popular beverage to produce relief from fatigue. A tranquilizing substance has recently been extracted from the roots.

Rauwolfia serpentina and canescens - Rauwolfia was used in India for centuries for its "calming effect upon lunacy". Today, Rauwolfia supplies the tranquilizing drug reserpine. Several species of this genus are native to Hawaii.

Vinca rosea - Periwinkle - The leaves of this small shrub are used to manufacture several anti-leukemia drugs. Periwinkle is very tolerant of drought conditions and grows well in Hawaii.

Cassia acutifolia and angustifolia - Senna - The dried pods and leaves of this shrub are much used in medicine for their mild laxative properties.

Campthotheca acuminata - Recent research indicates that Campthoteca might have potential as an anti-cancer medicine. There are several vigorous trees in Waimanalo Arboretum.

EDIBLE FRUITS

Annona muricata - Soursop - A cold beverage prepared from the fruits is very refreshing and is also used as a milk substitute for young children.

Averrhoa carambola - Starfruit - Averrhoa was by far the most popular fruit at the Hawaiian Botanical Society exhibit in the 1971 State Fair. Besides having a pleasing

taste, the acid juice is also used to clean metal surfaces and to reputedly cure drunkedness.

WOOD PRESERVATIVES

Anacardium occidentale - Cashew Nut - In addition to producing an edible nut and fruit, the tree sap can be used as a wood preservative against termites. Cardole Oil from the nut can also be used as a wood preservative. There is a large stand of Cashews in Maunawili, Oahu.

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* * * * *

CHARPENTIERA (AMARANTHACEAE) AS AN ORNAMENTAL

By S. H. Sohmer[1/] and R. T. Hirano[2/]

It was possible to obtain and cultivate cuttings of the genus Charpentiera from nearly all major islands of the Hawaiian Archipelago during the time spent by the first author on a systematic revision of the genus. The names used here for the plants are based on that revision (Sohmer, 1972). Cultivation of the cuttings was made possible by the hospitality of the Director and staff of the Lyon Arboretum in Honolulu. The second author undertook most of the labour involved with cultivating the collections. The cuttings were placed in cultivation in order to determine the effect of a standard environment on the relative expressions of certain of the morphological characteristics of members of the genus and to add to the collection of indigenous Hawaiian plants maintained at the Lyon Arboretum. Most of the collection has been placed into permanent plots.

There was apprehension at first as to whether Charpentiera could be easily propagated vegetatively. That apprehension was soon dispelled. Charpentiera reproduces easily from cuttings. This characteristic and the intrinsic aesthetic qualities of the plants have led us to believe that here is a native Hawaiian plant that should do extremely well as an ornamental.

Charpentiera is a member of the Amaranth family; the family which has given us Amaranthus, Celosia, Iresine, and others. Some of our most ubiquitous garden weeds are members of the Amaranthaceae. The Hawaiian name for members of the genus is papala. Charpentiera stands out in this family which is composed mainly of herbs since all members of the genus are trees. Charpentiera is native to the Hawaiian and Austral Islands. It was discovered on two of the Austral Islands, about 2,800 miles from Hawaii, by members of the Bernice P. Bishop Museum sponsored Mangarevan Expedition in 1934. The first author was able to visit the Austral Islands due to aid from the National Science Foundation and found few individuals of these populations left. Populations of the papala often occur in the gulches and on both the leeward and windward slopes of the Hawaiian Islands from about 500 to 5,000 foot elevation. The trees vary in size and habit considerably. Some are short and shrubby, not more than 10 feet high, adapted to dry forest, and others are tall, robust, relatively unbranched, to 40 feet high, of either dry or wet forests.

The simple leaves are rich green in color, smooth, and vary in length (petiole and blade considered together) from 10 to 70 cm. The flowers are small, averaging about 2.5 mm in length, and are without scent. The individual flowers therefore are inconspicuous but the hundreds of flowers that may be present on an inflorescence together make a rather conspicuous and aesthetic display, especially if they are of the type with a red to deep purple pigmentation. An individual of this type in full bloom would make a spectacular ornamental as any slight breeze causes the long, slender, pendant inflorescence to sway. The inflorescence may have one or two orders of branching. In the Hawaiian Islands blooming occurs from about January or February to August or September. This varies for species and locality. Flowering is generally continuous during this time and the fruit on the perfect-flowered trees remain for months.

With proper selection among the individuals of the genus, it is believed that a great variety of types may be obtained for different localities. Under natural conditions they are relatively free of insect pests, except for one type whose populations have been severely affected by a stem borer.

Cultivation.--Preliminary rooting trials of Charpentiera cuttings indicated that members of this genus can be easily propagated. The cuttings were rooted under mist (6 seconds every 2 minutes during daylight hours) in flats filled with vermiculite #2 or sponge rock - vermiculite mixtures. The age of the stem does not appear to have any significance in effecting rooting. Old, brown stems and young, green stems were found to root as well as soft apical cuttings.

Trials using rooting hormones such as Hormodin I and II were found to be no better than untreated checks. All treatments rooted well and rooting successes of nearly 100% were obtained. The number of leaves left on the cuttings does appear to have a significant effect.

In general, it was noted that cuttings with 2 to 5 leaves rooted faster and had a more vigorous root system than those which had 1 leaf or none. Rooting occurs in 4 to 6 weeks and cuttings may be planted in about 8 to 11 weeks.

1/ Department of Biology, University of Wisconsin, La Crosse, Wisconsin 54601. Work accomplished during Ph. D. studies at the University of Hawaii, Department of Botany.

2/ Junior Researcher, Harold L. Lyon Arboretum, University of Hawaii, Honolulu, Hawaii 96822.

The plants are heavy "feeders" and a good complete fertilizer is essential to maintain these plants at their best. When transplanting, it is desirable to slightly "overpot" as their growth rate is quite rapid. Insects and diseases do not seem to be much of a problem although there are occasional scale infestations. Plants 3 - 4 feet tall after 4-6 months of cultivation from 6-inch cuttings are not uncommon. Rooted cuttings from mature plants have been observed to flower while still in 5-inch pots and only 8 to 12 inches tall.

Table I lists the species of Charpentiera that are presently in cultivation at the Lyon Arboretum (Hirano and Nagata, 1972). Information concerning certain characteristics are provided and suggestions are made as to the best planting locations for a particular type. The growth information is based primarily on the field observations of the first author.

TABLE I

SUMMARY OF SOME CHARACTERISTICS OF CHARPENTIERA TAXA IN CULTIVATION AT THE HAROLD L. LYON ARBORETUM

Taxon	Form and natural habitat	Pigmentation	Recommendations for location
C. densiflora	Tree to 40 ft. tall; moist, shaded forest.	No red pigment present. Yellow-green inflorescence contrasts with dark foliage.	Shaded yard, with rich, moist soil. This can become a large regal tree.
C. obovata	Short, shrubby tree to 12 ft.; found in dry, open forest.	A dim red pigment present on flowers. Most not very showy, but some very bright carmine.	Exposed, sunny areas; will probably do well, even in poor soils.
C. ovata var. ovata	Slender tree to 20 ft.; moist forest, generally well shaded.	Varies, but bright red pigmentation often present on inflorescence.	Shaded to partially shaded locations; should have moist soil.
C. tomentosa var. maakuaensis	Slender tree to 20 ft.; moist, shaded forest.	Some with so much red pigmentation that the leaves are tinged as well as the inflorescence.	Shaded, moist locations.

Conclusion--This has been presented not only to publicize the potential use of members of this genus as ornamentals for Hawaiian gardens, but also in the hope that other workers will call attention to other native plants for the same purpose. It seems logical to see native Hawaiian plants in Hawaiian gardens and acceptance of native plants into Hawaiian gardens may be one of the means of preserving some of these plants from extinction.

We would like to add that in order to avoid the hybridization of diverse lines, whose derivatives might introgress with the natural local populations of that particular species, we feel that garden enthusiasts should make an attempt to cultivate those types of a given species that are derived from their own localities. In the case of Charpentiera, for example, a garden located on Tantalus above Manoa should give first preference to the cultivation of those types derived from populations presently in the Forest Reserves above Manoa.

Either author may be contacted for further information concerning Charpentiera.

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EVENTS

New meeting place for Botanical Society

Agee Hall, our meeting place for many years, is being closed, effective December 31, 1972. The Society will send a letter of thanks to the HSPA with copies to the Honolulu Advertiser and Honolulu Star-Bulletin to record our appreciation for use of Agee Hall.

The next regular meeting will be held at the Church of the Crossroads which has made a conference room available for a small fee. To reach the Church of the Crossroads from University Avenue, turn Ewa on Coyne Street, go one block and turn mauka on Kaialiu Street, go one block to junction with Bingham Street.

Ray Jerome Baker - 1880-1972

Ray Jerome Baker, long-time member of the Society, died in Honolulu on October 27, 1972, at the age of 91 years.

Born in Rockford, Illinois, he came to Hawaii in 1910. Here he became a legend in his own time, sometimes being called the "Mathew Brady of Hawaii"; he had the historian's instinct and insight for preserving Honolulu's landmarks on film.

During the many years following his becoming a member of this Society, he treated the members to many slide- and movie-talk shows of plants and scenes of Nature taken locally and on his 60 or more trips to other countries.

Older members will remember that Mr. Baker, a pioneer in time-lapse photography, presented a beautiful film he had made of local plants using this technique, so new and dramatic at that time.

Although Mr. Baker was not fundamentally a "scientific" photographer, he was called upon on several occasions because of his meticulous concern to photograph botanical specimens for scientific publications.

We salute Mr. Baker, in memory, as a fellow member, as a friend, and as a great artist in the field of photography.

Nursery stock for Kahoolawe

The following kinds of plants are being propagated at the Division of Forestry nursery at Kahului, Maui for outplanting on Kahoolawe during the winter Kona storms season for various sites as shown:

Site	Native plants	Introduced plants
Beach	Kamani	Sea grape
	Milo	False kamani
	Naupaka	Madagascar olive
	Creeping naupaka	Tree heliotrope (Messerschmidia argentea)
	Coconut	
	Kou	
Beach and middle elevations	Ma'o	--
	Ohai	--
Beach, Middle elevations and top	--	Longleaf ironwood
	--	Shortleaf ironwood
	--	Tamarisk
Middle elevations and top	Iliahi (S. ellipticum)	Ombu (Phytolacca dioica)
	A'ali'i	Tamarind
	Wiliwili	
	Koai'a	
	Naio	
	Lama	
	Ohe makai	
Top	Ulei	Norfolk-island-pine
	Kukui	
	Alopua	
	Nanu	
	Koa (dryland type)	
	Alahe'e	

Wesley H.C. Wong, Jr., District Forester

H.B.S. supports proposal for Haleakala National Park

Under date of November 15, President Ruth Gay addressed a letter to the National Park Service in support of an Environmental Impact Statement for proposed Wilderness Classification of Haleakala National Park. It pointed out that if Kapahulu Research Natural Area is to be useful for scientific research, scientists must be allowed to camp within its boundaries because of the extremely difficult means of access.

Office of Environmental Quality Control

President Ruth Gay sent a 3-page reply to an inquiry from Dr. Marland of OEQC to describe our objectives and the position we have taken on several important matters within the field of Environmental Quality, November 15, 1972.

Scientists on the move

Robert M. Warner.--Aug. 31-Sept. 12, Portland, Oregon to annual meeting of the International Plant Propagators Society where he delivered a paper, "Propagation of Tropical Plants". He reported that IPPS will meet in Honolulu at the Surfrider Hotel, Aug. 16-26, 1973. Dr. Warner asks us to remind readers that plant propagators in Hawaii are encouraged to become members of IPPS.

Fred Rauch also attended the recent meeting of IPPS in Portland.

James L. Brewbaker.--Oct. 25-Nov. 5, Florida, Crop Science Society of America (formerly Am. So. Agron.). He delivered a paper, "Biochemical Fingerprinting--a method of varietal identification." He also visited a seed production area at Homestead, Florida and participated in a seminar at U. C. Riverside.

Warren Yee.--Oct. 28-Nov. 11, Consultant to South Pacific Commission Fruit Conference, Roratonga, Cook Islands, where diversification of crops was discussed.

Philip E. Parvin.--Oct. 14, Third Annual Drip Irrigation Seminar, Escondido, California.

Donald P. Watson.--Sept. 5-9, Congress of American Horticulture, Seattle.

Russell K. LeBarron.--Sept. 20-Nov. 6, Seventh World Forestry Congress, Buenos Aires, Argentina and excursions to NW Argentina, Tierra del Fuego, Uruguay, Colombia, and Huntsville, Texas. The visit to the last named site was to observe research by Champion International Corporation on tree propagation techniques and selection of eucalypts for cold resistance.

Remarkable! (What is wrong with this description?)

"It was sunset when a fleeing Hawaiian warrior left the cover of the kiawe scrub and sprinted across the rough lava rock to the enclosure that faced the sea. He made the boundary and disappeared within. He was safe now from the wrath of a vengeful chief of a warring faction. He was within the pagan temple of the city of Refuge." Travel Magazine, February 1970. (For the benefit of the uninitiated, the explanation will appear in the next issue of the NEWSLETTER.

Ohelo-kai

Some months ago while visiting the new Kuilima Hotel, Walter Holt spotted a strange appearing beach plant which he suspected to be a native. He cautioned the gardener not to destroy it as a weed and took home four cuttings, three of which rooted successfully. The plant is ohelo-kai, Lycium sandwicense Gray, which Marie C. Neal says is native to Hawaii, Juan Fernandez and Rapa.

Opposition to introduction of axis deer to the big island

We continue to receive copies of petitions and letters from widely dispersed out-of-State sources, including several of foreign origin. The Degeners appear to have been especially effective in generating such messages of concern. Locally, the Hawaii Section of the Society of American Foresters has approved a resolution to advise against the proposed introduction.

SOCIETY BUSINESS

The following are not complete minutes - only a few highlights.

September 18, 1972 - Executive Board

1. A guest, Dennis Ayers, U.H. Agronomy and Soil Science Students Association reviewed the history leading up to recent proposals to demolish Gilmore Hall and use the site for a new Art Building.
2. Wayne Gagne summarized the Environmental Educational Conference, Sept. 16, 1972, which he attended on the Society's behalf.

October 2, 1972 - Regular meeting

1. Steve Montgomery summarized recent developments in the animal introduction program of Molokai Ranch.
2. Discussion of need for a new meeting place. Agee Hall is being closed, December 31, 1972.

3. A letter from Councilman Chikasuye to Dr. Marland proposes a covered drainage canal through Ala Moana Park.
4. Beatrice Krauss elected to Honorary Member grade.
5. R. E. Nelson selected as Editor for Newsletter.
6. Nominations committee; Sugawa (Ch.), Porter, Miller.
7. Auditor; William Bush.
8. Speaker of the evening, Fred Erskine, Chairman, Board of Agriculture "The future of agriculture in Hawaii".

November 6 1972 - Executive Board and Regular meetings.

1. Treasurer authorized to pay $5 dues to Friends of Foster Gardens.
2. Ron Hurov appointed to head a new Agricultural Advisory Committee; particular attention to diversification and problems on Oahu.
3. State Office of Environmental Quality has requested the views of the Society (See item in events.)
4. Dr. William Bush reported that Trustees of the Marie C. Neal Fund have authorized purchase of a new plaque for the annual inscribing of the name of the "Student most likely to reflect credit on botany", payment of xeroxing expenses, and $100 each to Friends of Foster Gardens and Wau Ecology Institute.
5. Nominations slate: President, Ted Green; Vice President, William L. Theobald; Secretary, Wayne Gagne; Treasurer Ercell Woolford; Trustees Member-at-large, Marian Mapes; Trustee of Marie C. Neal Fund, Ruth Gay.
6. Speaker of the evening, William L. Theobald, Dept. of Botany, U.H., "Flora of Ceylon Project."

December 4, 1972 - Regular meeting

1. New officers (see outside, last page).
2. New meeting place announced (See Events).
3. Plant exchange.
4. Speaker of the evening; Ruth Gay, Retiring President's address. Topic, "Forest Communities on the Big Island".

PUBLICATIONS

REVIEWS

Life in the Marshall Islands 1972

E. H. Bryan, Jr., Pacific Scientific Information Center, Bernice P. Bishop Museum. Honolulu, Hawaii 96818. 237 pages, illus. Price $5.00.

Probably most people have only comparatively vague notions about the location and nature of the Marshall Islands. For their benefit, let us remind readers that a popular modern garment has the name of an atoll in this group--Bikini. The author of "Life in the Marshall Islands", Edwin H. Bryan, Jr., is a distinguished, long-standing member of our Society. He explains in an introductory section that he originally compiled the material in this book in the form of weekly articles for the Hourglass, Kwajalein's newspaper during 1965 and 1966. Later, these were stapled together and ultimately, as a result of continuing demand for copies, he revised and published most of the material in the present book.

As the title indicates, the treatment of the subject is encyclopedic. It begins with brief explanations of the geography of the Pacific Ocean and the coming of man and other terrestrial organisms to this region in prehistoric times. In twenty two chapters it describes the principal plants, birds and other life forms, the social and economic life of the island peoples and their navagational and artistic attainments, the discovery of the islands by Europeans and major subsequent events up to and including the testing of atomic bombs and the associated forced movements of some indigenous human populations.

Two features of the book are of especial interest to students of botany:

1. A guide to more than 100 kinds of plants, including recent introductions as well as indigenous species and those brought by the ancestors of the Marshallese. The kinds of plants capable of enduring the narrow range of climatic and edaphic conditions of tropical atolls are decidedly limited in numbers. Most of those named are the same as, or close relatives of, some of Hawaii's more common plants.
2. A chapter entitled "Making a living on an atoll". This identifies the more important economic plants including coconut, breadfruit, pandanus, banana, arrowroot and taro (several distinct types). The chapter also describes how these plants were used, including some rather detailed explanations of preparation for eating. Uses of wood and fibre are included, too. In some contrast to the popular concept of "island paradises', the author emphasizes that living in a low tropical island was not easy for the aborginal inhabitants.

The book can be read for pleasure as well as for reliable information about Oceania in general and the Marshall Islands in particular.

Russell K. LeBarron

A Catalog of Plants in the Plant Science Instructional Arboretum 1972

Robert M. Warner. College of Tropical Agriculture, University of Hawaii. Honolulu, Hi 96822. 34 pages, illus.

The economic and ornamental vegetation of Hawaii has been greatly enriched by introduced plants. Today, the processes of introducing, testing, and improving plants for use here are conducted chiefly by the Hawaii Agricultural Experiment Station. "A Catalog of Plants...." is a list of the 450 or more species and varieties representing 57 families in the collection at the Plant Sciences Instructional Arboretum. The great majority of these are comparatively recent introductions.

The Arboretum is situated at the Waimanalo Research Station on the island of Oahu at an elevation of 90 feet. It covers an area of 7.5 acres. The collection can be of great value to landscape architects, home owners and agriculturists as well as to students and scientists.

Dr. Warner, author of the publication is Professor in Charge of the Arboretum.

Russell K. LeBarron

The Flora of Guam 1970

Benjamin C. Stone. Journal of the University of Guam, Micronesica Vol. 6, 600 pp., illus.

This book contains descriptions, keys, illustrations, scientific and native names, bibliography, and phytogeographic and historical notes, all completely indexed. It is recommended as an authoritative, outstanding contribution to knowledge of the botany of Guam. It lists 931 species representing 546 genera as the present flora, including 6 gymnosperms, 58 ferns and fern allies, 262 monocotyledons, and 605 dicotyledons. The author believes that 346 of these plants are native although about 20 may have been escapes; the remainder introduced.

(These notes were excerpted from a review prepared by E. H. Bryan, Jr. for another outlet.)

Conservation and Hawaii's Conservation Districts--What is Conservation Land? 1972

League of Women Voters of Hawaii, 1802 Keeamoku St., Honolulu, Hawaii 96822. 14 pages. Thirty cents.

I would like to say that the title of this pamphlet should be, "Hawaii's Land Use Laws Made Easy" but neither the subject nor the explanation is that simple. Nevertheless, this is surely the best explanation by a "lay person" for lay people of Hawaii's "Conservation District" which makes up half of all the land in our State and thus is of vital importance to all true conservationists. Land zoning is a more basic issue than pollution control for example. Land use deals with management of the natural resources. In contrast, pollution control attempts only to treat the symptoms instead of the disease.

Unlike Gaul, which was divided into three parts, Hawaii has been divided into four zones, Urban, Rural, Agricultural and Conservation--in about that order. I say, "in about that order" because the Conservation zone seems to have been composed of the left-overs when the pie was cut a decade ago. Unfortunately, these left-overs are subject to encroachments.

This little analysis is "must" reading for conservationists. It doesn't solve the problems but it shows what some of them are and thus puts us on notice to start thinking up better solutions.

Russell K. LeBarron

RECENT LITERATURE

Publications are reported alphabetically by authors' names on a round robin basis to fill out the last page or two. This issue begins with "A".

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Evaporation and Transpiration. EOS, Transactions of AGU 52 (6): 286-291.

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Fullaway, David T. et al. 1972(March)
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Contributions from the Nature Conservancy, No. 7: 3-14.

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Disjunct Foliar Veins in Hawaiian Euphorbias.
Science 171: 1247-1248.

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University of Hawaii, Cooperative Extension Service, Department of Plant Pathology, Plant Disease Clinic Notes No. 13.

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HAWAIIAN BOTANICAL SOCIETY
c/o Department of Botany
University of Hawaii
3190 Maile Way
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